SLOVENSKI STANDARD
oSIST prEN 303 215 V1.4.6:2025

01-april-2025

Okoljski inženiring (EE) - Merilne metode in mejne vrednosti za porabo električne energije v opremi za širokopasovna telekomunikacijska omrežja

Environmental Engineering (EE) - Measurement methods and limits for power consumption in broadband telecommunication networks equipment

Ta slovenski standard je istoveten z: **ETSI EN 303 215 V1.4.6 (2025-01)**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing
33.040.01	Telekomunikacijski sistemi na splošno	Telecommunication systems in general

oSIST prEN 303 215 V1.4.6:2025 **en**

Draft ETSI EN 303 215 V1.4.6 (2025-01)

Environmental Engineering (EE); Measurement methods and limits for power consumption in broadband telecommunication networks equipment

Reference
REN/EE-EEPS71

Keywords
broadband, energy efficiency, power supply

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Contents

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI IPR online database.

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI EN Approval Procedure (ENAP).

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Executive summary

The present document defines the energy consumption metrics and measurement methods for fixed broadband telecommunication network equipment.

1 Scope

The present document defines the power consumption metrics, the methodology and the test conditions to measure the power consumption of broadband fixed telecommunication networks equipment. The present document does not cover all possible configuration of equipment but only homogenous configurations.

The types of broadband access technologies covered by the present document are the ones widely deployed at the date of publication. Currently, the present document considers DSLAM DSL, MSAN, PON OLT and Point to Point OLT equipment. Other access technologies may be included in further versions of the present document.

The present document also considers measurement methodology for VDSL2 equipment with vectoring functionality.

In addition to the full power state, power-saving states as defined in DSL standards [i.1] and [i.2] are also covered.

The present document focuses on Network Equipment. The end-user equipment is handled in other documents, see ETSI EN 301 575 [i.6] for CPE [i.6] and ETSI EN 303 423 [i.9] for network standby.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the ETSI docbox.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 101 388: "Access Terminals Transmission and Multiplexing (ATTM); Access transmission systems on metallic access cables; Asymmetric Digital Subscriber Line (ADSL) - European specific requirements [ITU-T Recommendation G.992.1 modified]".

[2] ETSI EN 300 132-2: "Environmental Engineering (EE); Power supply interface at the input to telecommunications and datacom (ICT) equipment; Part 2: Operated by -48 V direct current (dc)".

[3] ETSI TS 101 271 (V1.1.1): "Access Terminals Transmission and Multiplexing (ATTM); Access transmission system on metallic pairs; Very High Speed digital subscriber line system (VDSL2); [ITU-T Recommendation G.993.2 modified]".

[4] Void.

[5] ETSI ES 201 970: "Access and Terminals (AT); Public Switched Telephone Network (PSTN); Harmonized specification of physical and electrical characteristics at a 2-wire analogue presented Network Termination Point (NTP)".

[6] Recommendation ITU-T G.984.1: "Gigabit-capable passive optical networks (GPON)".

[7] Recommendation ITU-T G.984.2: "Gigabit-capable Passive Optical Networks (G-PON): Physical Media Dependent (PMD) layer specification".

[8] IEEE 802.3™: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".

[9] Broadband Forum oneM2M TR-100: "ADSL2/ADSL2plus; Performance Test Plan".

[10] Broadband Forum oneM2M TR-114: "VDSL2 Performance Test Plan".

[11] Recommendation ITU-T G.9807.1: "10-Gigabit-capable symmetric passive optical networks (XGS-PON)".

[12] Recommendation ITU-T G.9804.3: "50-Gigabit-capable passive optical networks (50G-PON): Physical media dependent (PMD) layer specification".

[13] 25GS-PON Specification Version 3.0 (November 2023): "25 Gigabit Symmetric Passive Optical Network".

[14] Recommendation ITU-T G.9805: "Coexistence of passive optical network systems".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Recommendation ITU-T G.992.3 (2009): "Asymmetric digital subscriber line transceivers 2 (ADSL2)".

[i.2] Recommendation ITU-T G.992.5 (2010): "Asymmetric Digital Subscriber Line (ADSL) transceivers - Extended bandwidth ADSL2 (ADSL2plus)".

[i.3] Recommendation ITU-T G.993.2 (2015): "Very high speed digital subscriber line 2 (VDSL2)".

[i.4] ETSI TR 102 530: "Environmental Engineering (EE); The reduction of energy consumption in telecommunications equipment and related infrastructure".

[i.5] Broadband Forum oneM2M TR-202: "ADSL2/ADSL2plus Low-Power Mode Guidelines".

[i.6] ETSI EN 301 575: "Environmental Engineering (EE); Measurement method for energy consumption of Customer Premises Equipment (CPE)".

[i.7] IEC 60050: "International Electrotechnical Vocabulary - Electrical and electronic measurements and measuring instruments - Part 311: General terms relating to measurements - Part 312: General terms relating to electrical measurements - Part 313: Types of electrical measuring instruments - Part 314: Specific terms according to the type of instrument".

[i.8] IEC 62018: "Power consumption of information technology equipment - Measurement methods".

[i.9] ETSI EN 303 423: "Environmental Engineering (EE); Electrical and electronic household and office equipment; Measurement of networked standby power consumption of Interconnecting equipment".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

accuracy (of a measuring instrument): quality which characterizes the ability of a measuring instrument to provide an indicated value close to a true value of the measurand

NOTE 1: This term is used in the "true value" approach.

NOTE 2: Accuracy is all the better when the indicated value is closer to the corresponding true value.

NOTE 3: See IEC 60050 [i.7], definition (311-06-08).

active line: line in operational mode and carrying traffic as specified for that mode of operation (ADSL2plus or VDSL2)

broadband telecommunication network equipment: equipment of broadband technology that is part of a telecommunication network

broadband terminal equipment: equipment of broadband technology that is connected beyond the Network Termination Point of a telecommunication network

full-power state: state in which the maximal allowed data transmission is possible

NOTE: The maximum is defined by the physical properties of the line and the settings of the operator (e.g. L0 for ADSL2/2plus).

low-power state: state in which a limited power reduction capability and a limited data transmission is allowed

NOTE: It is entered automatically from the full power state after the data transmission during a certain time is lower than the limit. If more than the limited data has to be transmitted from either side a state change to the full power state is entered automatically. The low power state may comprise multiple sub-states with history dependant state transition rules (e.g. L2 for ADSL2/2plus).

power consumption: power used by a device to achieve an intended application performance

stand-by state: state in which the largest power reduction capability and no transmission of data is possible

NOTE: From this state a direct state change to the full-transmission state is possible, if data has to be transmitted from either side (e.g. L3 for ADSL2/2plus).

telecommunication network: network operated under a license granted by a national telecommunications authority, which provides telecommunications between Network Termination Points (NTPs) (i.e. excluding terminal equipment beyond the NTPs)

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

25GS-PON	25-Gigabit Symmetric Passive Optical Network
50G-PON	50-Gigabit Passive Optical Network
AC	Alternative Current
ADSL	Asymmetric Digital Subscriber Line
ADSL2plus	Second generation ADSL with extended bandwidth
BBF	BroadBand Forum
CPE	Customer Premises Equipment
DBA	Dynamic Bandwidth Allocation
DC	Directive Current
DPBO	Downstream Power Back-Off
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DSM	Dynamic Spectrum Management
GPON	Gigabit Passive Optical Network
IP	Internet Protocol
LT	Line Termination
MAC	Media Access Control
MELT	MEtallic Loop Test
MIMO	Multiple Input Multiple Output

MPLS	MultiProtocol Label Switching
MSAN	Multi Service Access Node
NPC	Normalized Power Consumption
NT	Network Termination
NTP	Network Termination Point
OLT	Optical Line Termination
ONU	Optical Network Unit
P2P	Point to Point
PON	Passive Optical Network
POTS	Plain Old Telephone Service
QoS	Quality of Service
SNR	Signal Noise Ratio
SOHO	Small Office/Home Office
UPBO	Upstream Power Back-Off
VAC	Ventilation Air Conditioning
VDSL	Very-high-speed Digital Subscriber Line
VDSL2	Second-Generation VDSL
VLAN	Virtual Local Area Network
XGS-PON	10-Gigabit Symmetric Passive Optical Network

4 Definition of power consumption

4.1 Definition of power consumption per port of broadband network equipment

The power consumption of broadband telecommunication network equipment is defined as:

$$P_{BBport} = P_{BBeq} / N_{ports}$$

Where:

P_{BBeq} is the power consumption (in W) of a fully equipped broadband network equipment, measured at the electric power input interface, placed at the premises of the operator or the equipment supplier, which connects multiple broadband subscribers to a backbone. P_{BBeq} is measured in determined environmental conditions defined in clause 5.1.1.

P_{BBport} is the power consumption per port in W of the broadband network equipment for which the limits are defined in the present document.

N_{ports} is the maximum number of subscriber lines access ports served by the broadband network equipment under test.

4.2 Power consumption taking into account the low-power states

The low-power states are intended to reduce the power consumption during periods of no or minimal traffic needs (e.g. low data-rate applications or control signalling only). When these low-power states are used, the achievable power consumption reduction can be estimated by using profiles based on user traffic assumptions, some examples of user hourly traffic as illustrated in annex A.

NOTE 1: Example of power-saving states usage:

A number of power-saving states are defined in the DSL standards (L2, L3, Recommendations ITU-T G.992.3 [i.1] and G.992.5 [i.2]). These power-saving states are implemented, both in the Network equipment (i.e. the subject of the present document) and the CPE/end-user equipment deployed at the premises of the user of the broadband line; this will enable the operator to use these to further limit the power consumption of the equipment. Further study is required to optimize the way in which the low-power states are controlled. In particular, to determine the levels of interference that might arise due to the fluctuating crosstalk caused by frequent multi-state power transitions.